UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF LOUISIANA
LAKE CHARLES DIVISION

BROOKSHIRE BROTHERS HOLDING, INC., ET AL	§	CASE NO. 2:04cv1150
VERSUS	§	JUDGE TRIMBLE
TOTAL CONTAINMENT, INC., ET AL	§	MAG. JUDGE WILSON

DEFENDANT SHELL CHEMICAL LP'S RESPONSE IN OPPOSITION TO PLAINTIFFS' MOTION TO EXCLUDE CERTAIN EXPERT OPINIONS OF DRS. BROUTMAN, CASSIDY AND PAUL

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TABLE OF CONTENTS

TABLE OF AUTHORITIES

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Now into Court, through undersigned counsel, comes Shell Chemical LP ("Shell"), who files this its Response in Opposition to Plaintiffs' Motion in Limine Concerning Dr. Broutman and Testing Report and Analysis of Dr. Patrick Cassidy and Dr. Donald Paul.

SUMMARY

Plaintiffs filed a motion to exclude certain testimony of two of Shell's experts related to specific testing and engineering analysis that these experts conducted to assess why the Total Containment, Inc. ("TCI") primary gasoline hoses leaked, or "failed."[1] Shell's experts have determined that the hose failures are primarily caused by hydrolysis (or degradation) of the hose's ester-based polyurethane layers. These are the middle layers in the hose and, when they are not intact, the hose's structural support system is severely damaged. Without this support system, these hoses are susceptible to damage from the cyclic pressure changes that are part of normal gasoline station operations.

This conclusion is based on examination of the failed TCI hose, testing of the hose components, and a number of laboratory analyses, scientific experiments and calculations. The

[1] Note that the title to Plaintiffs' motion suggests that they also seek to exclude work or opinions of Dr. Paul (another of Shell's scientific experts), but there is no reference to specific work or opinions of Dr. Paul that they seek to exclude in their motion. As a result, Shell asserts that Plaintiffs have not submitted an appropriate motion to limit any of Dr. Paul's testimony.

ester-based polyurethane layers degrade because Plaintiffs have improperly allowed the hoses to sit immersed in water in their underground storage tank secondary containment systems for years at a time. Plaintiffs obviously want to deflect responsibility from their negligence in the management of their gasoline storage and delivery systems. Nevertheless, Shell's scientific evidence was meticulously developed, is directly relevant to both the hose operating conditions and the appropriate failure analysis inquiries, and represents the highest quality scientific evidence under the standards of Rule 702.

Specifically, Plaintiffs seek to limit expert testimony in the following two areas:

- Dr. Cassidy's cyclic pressure fatigue experiments that compared the performance of an intact TCI hose with a similar sample where the support structure had been removed; and
- Dr. Broutman's finite element analysis ("FEA") of the predicted stresses and strains in the hose and the interior Carilon liner designed to model the hose conditions applied during Dr. Cassidy's test.

Plaintiffs do not attack these experts' qualifications to render such opinions or their representative experience in the scientific community. Instead, Plaintiffs merely assert that these experiments and analysis do not precisely replicate the operating conditions of the TCI hoses. At best, this attack on Shell's experts goes to the weight of the testimony and does not satisfy the standard to exclude expert opinions under the federal rules.

Federal Rule of Evidence 702 requires that the Court ensure that the expert's testimony is based on a reliable scientific foundation.[2] Failure analysis, like that at issue in this case, is best

[2] The Fifth Circuit has described this Court's gatekeeping function under Rule 702 and *Daubert* as follows: "[m]any factors bear on the inquiry into the reliability of scientific and other expert testimony, including, but not limited to, whether the expert's theory or technique: (1) can be or has been tested; (2) has been subjected to peer review and publication; (3) has a known or potential rate of error or standards controlling its operation; and (4) is generally accepted in the relevant scientific community." *Burleson v. Texas Dept. of Criminal Justice*, 393 F.3d 577, 584 (5th Cir.2004). As set out below, all of these factors support admission of the two disputed analyses.

evaluated using the "scientific method" where the expert develops a hypothesis regarding the cause of failure, and then tests that hypothesis against properly designed scientific observations, experiments and calculations.[3] The fundamental hypothesis which is set out in Dr. Cassidy's and Dr. Paul's report before the disputed pressure cycle testing and FEA work was even conducted is that the hose fails as a result of cyclic pressure fatigue following loss of the structural support of the hose. As demonstrated below, Dr. Cassidy's cyclic pressure test and Dr. Broutman's FEA work are scientifically designed experiments and analyses that directly test the validity of that hypothesis. Moreover, these experiments and calculations provide direct scientifically rigorous support for the validity of the underlying failure mechanism proposed by Shell's experts, and as a result, this evidence is clearly admissible under FRE 702.

ARGUMENT AND AUTHORITIES

A. Failure of the TCI Hoses Occurs Because of Loss of Structural Support.

Before discussing the details of the tests and calculations conducted by Dr. Cassidy and Dr. Broutman, it is important to understand their fundamental failure analysis hypothesis because the testing is directly related to proving that hypothesis. The hose at issue is the second generation TCI primary gasoline hose that was manufactured by Cleveland Tubing, Dayco and TCI in the 1995 through 1998 time period. This particular version of the TCI primary hose represents the vast majority of the failed hose at issue in this litigation, and almost all of the TCI primary hose with a Carilon liner. This second generation TCI primary hose is a complex construction, which is composed of five separate layers each with a distinct design purpose. A Dayco design drawing of the hose, including a description of the five layer construction, is

[3] *See Oddi v. Ford Motor Co.*, 234 F.3d 136, 156 &159 (3rd Cir. 2000); *Pride v. BIC Corp.*, 218 F.3d 566, 571 & 578 (6th Cir. 2000).

attached as Exhibit A. As described below, this five-layer hose was constructed in 4 separate manufacturing steps at two different manufacturing locations.

The first manufacturing step involved the co-extrusion of a thin corrugated two-layer plastic tube. The inside layer of this corrugated tube was made of Carilon, which functioned as a chemical barrier to prevent permeation of the gasoline. The Carilon liner was not designed to provide structural support to the final product—only chemical resistance. The outside layer of this corrugated tube was made from *ester*-based polyurethane.[4] The polyurethane and Carilon were simultaneously co-extruded to insure good adhesion between the two materials. This corrugated ester-based polyurethane layer was designed as an adhesive (or what is sometimes referred to as a "tie-layer") to chemically bond the corrugated tube to the next layer of the hose. For most of the production period, this first manufacturing step was completed by Cleveland Tubing, and the partially manufactured hose was placed on large spools and shipped to Dayco's manufacturing facility in Ocala, Florida for completion of the manufacturing process.

The second manufacturing step involved the extrusion of a smooth layer (not corrugated) of ester-based polyurethane over the outside of the corrugated tube. The purpose of this second ester-based polyurethane layer was to provide a smooth surface to anchor and transmit the mechanical load (or internal pressure) to the polyester fibers, which were applied next. In the third manufacturing step, polyester (or PET) fibers were tightly woven in a diamond pattern over this newly-applied smooth ester-based polyurethane layer such that the fibers and urethane were tightly adhered—both because of the tension (tightness) with which the fibers were applied and an adhesive bond between the fibers and the polyurethane. Importantly, the polyurethane layer

[4] It is a little confusing, but the hose construction incorporated two different kinds of polyurethane. Two interior layers are made of *ester*-based polyurethane, and the outside cover is made of *ether*-based polyurethane. While these two materials are within the same general family of polymers, they have significantly different properties when it comes to resistance to water and fuel exposure. Thus, in the context of this dispute, it is important to distinguish between the two materials.

and the polyester fibers function together as the structural support for the hose (somewhat like how rebar reinforces concrete to make it stronger), and prevent the hose from bursting when placed under pressure. The final manufacturing step involved the extrusion of a smooth layer of ether-based polyurethane (the second type of polyurethane, see footnote 4 *supra*) over the polyester fibers. This outside cover was designed to provide abrasion protection as well as protection from *casual* water and fuel exposure to the outside of the hose. A detailed discussion of the hose components and their design function is included in Dr. Cassidy's and Dr. Paul's original expert report, which is included as Exhibit B.

Shell's experts opine that many of the TCI primary hoses failed because of hydrolysis of the ester-based polyurethane layers, which compromises the structural support design of the hose (to extend the prior analogy—similar to concrete crumbling such that it falls away from the rebar in reinforced concrete). *See id.* Hydrolysis in this instance refers to a chemical attack on the ester bonds in the polyurethane caused by water, which occurs because Brookshire's regular operating practices permit the hoses to be submerged under water for months or years at a time. *Id.* This failure causation hypothesis is based on a large amount of supporting data and analysis, including:

- Review of the Tetra Tech photographs from over a hundred hose repair events documented that Brookshire Brothers operated most of its underground storage tank sumps full of water as a normal operating practice. As a result, a significant amount of primary hoses sat in water for months, if not years, at a time.

- Permeation testing of the ether-based polyurethane cover of the primary hose confirmed that this cover was highly permeable to water and would permit saturation of the interior ester-based polyurethane layers with water, if the hose was improperly allowed to sit submerged in water.

- In addition, analysis of the hose coupling design, presence of crevice corrosion within the coupling, as well as pressure testing confirmed that the crimp joint between the outside brass sleeve and the inside ferrule for the hose coupling was not water-tight. This joint is another significant water entry point to the ester-based polyurethane layers if the coupling is submerged under water.

- Numerous primary hose samples exhibited general crumbling and virtual complete loss of mechanical properties of the ester-based polyurethanes consistent with extensive hydrolysis. These conditions are easily visible to the eye. Subsequent laboratory testing using gel permeation chromatography of the ester-based polyurethanes confirmed the degradation by hydrolysis.

- Further examination of these hoses demonstrated that the polyester fibers have loosened and disengaged from the ester-based polyurethane layer such that the pressure load could not be efficiently transmitted from the corrugated tube to the fibers. This essentially placed the pressure load for the hose on the thin corrugated tube.

See Cassidy and Paul Expert Report, attached as Exhibit B.

Plaintiffs' experts, particularly Dr. Manning, responded to Shell's failure analysis theory by testifying at their depositions that the loss of structural support of the hose should not adversely impact the performance or service life of the hose to a significant extent. *See* Manning Depo. at pp. 241-246 (specifically, see p. 246 lines 8-15 where Dr. Manning testifies that he would expect to see crack formation in both samples if side-by-side tests were run similar to Dr. Cassidy's pressure cycling test), excerpts attached as Exhibit C.

In response to this testimony, Dr. Cassidy ran his cyclic pressure test and Dr. Broutman conducted his FEA work to directly test Shell's failure analysis hypothesis against Dr. Manning's criticism. Specifically, what Shell's experts sought to do was to simultaneously *compare* the performance of the hose with its structural support intact to performance of the hose without structural support under identical operating conditions. If Dr. Manning is correct and the primary problem is the condition of the Carilon liner, one would expect roughly equal damage to both sets of samples (just as he testified during his deposition) because according to Dr. Manning the condition of the structural support is not relevant to the failure mechanism. That, however, is not what happened. Indeed, only the sample without structural support showed any damage -- test results that demonstrate dramatic support for the failure hypothesis developed by Shell's experts.

B. **Dr. Cassidy's Cyclic Pressure Test Was Specifically Designed to Test One of the Primary Failure Analysis Hypotheses at Issue in this Case.**

Plaintiffs' complaints regarding the opinions of Dr. Cassidy relate exclusively to the cyclic fatigue testing that Dr. Cassidy conducted on TCI primary hose samples during June 2006. The essence of Plaintiffs' complaint is that the conditions imposed by this test do not exactly replicate the Brookshire gas station operating conditions, and accordingly this test is not a reliable "re-enactment" of the specific hose failures. The three cases that Plaintiffs cite in their motion are all "re-enactment" cases, where the issue was whether an experiment that was specifically designed to exactly reproduce or "re-enact" the event underlying the litigation was an accurate and reliable reproduction of that event. *See United States v. Norris*, 217 F.3d 262, 270 (5th Cir. 1996)(addressing experiment that re-enacted criminal defendant's testimony regarding how he burned U.S. currency); *Williams v. Briggs Co.*, 62 F.3d 703, 707-708 (5th Cir. 1996)(re-creation of accident involving water heater after heater at issue had been repaired); *Barnes v. General Motors Corp.*, 547 F.2d 275, 277 (5th Cir. 1977) (re-creation of an automobile accident).

Specifically, Plaintiffs complain that (i) the upper boundary pressure of the cyclic fatigue testing was 50 pounds per square inch gauge (psig), which is greater than the normal operating pressure for the Brookshire gasoline systems of 35 psig, and (ii) the hose ends during the cyclic testing were not fixed, but rather were unrestrained and permitted to move as the hose expanded under pressure. Both complaints arise from the allegation that the test conditions did not exactly replicate the specific operating parameters of Brookshire system operating conditions.

These objections, however, reflect a fundamental misunderstanding regarding the purpose of the cyclic fatigue test. This test was never purported to be a "re-enactment." Dr. Cassidy's test was essentially a **side-by-side comparison test** designed to demonstrate the

critical importance of the integrity of the polyester fiber and ester-based polyurethane matrix to performance of the hose. It is an accelerated fatigue test designed to measure the difference in performance of two samples under the same fatigue conditions. Moreover, the two test conditions highlighted in Plaintiffs' motion (50 psig and unrestrained ends) were reasonable and consistent with both the design parameters of the Brookshire installations and the scientific purpose of the cyclic fatigue test.

The failures of the Brookshire hoses occurred over many years (most in excess of 7 years), and one simply cannot "re-enact" this process exactly in a short-term laboratory test. Not surprisingly, that was not Dr. Cassidy's purpose. Instead, his experiment was an accelerated fatigue test that compared the performance of two hose samples under identical experimental conditions. Cassidy Declaration at ¶ 3, attached as Exhibit D. This type of test is commonly used and accepted in the scientific community for the assessment of hose or pipe potentially subject to cyclic pressure changes. *Id.* There is no question that the Brookshire hose systems are subjected to repeated pressure cycling as part of their normal operating condition (as the pump turns on and off). *See id.* at Exhibit 2, citing excerpts of Mr. Boley's deposition, at pp. 43-44.

As described above, Dr. Cassidy compared the cyclic fatigue performance of the Carilon tube under identical pressure conditions for two different structural support conditions (i) with the structural support intact, and (ii) with the structural support removed. *Id.* at ¶ 7. If Shell's experts were correct, one would expect a poorer performance of the unsupported tube as compared to the hose with the support structure in place, and if Plaintiffs' expert was correct, one would expect roughly equivalent performance of both samples (i.e., equivalent indications of failure, cracking or other failure precursors). *Id.*

The testing demonstrated that the difference in performance of the two samples was dramatic. The Carilon layer in the hose sample with the intact structural support did not fail and indeed showed absolutely no indications of failure precursors after completion of the entire test—no cracking, no stress whitening, and no other signs of mechanical stress. *Id.* at ¶ 8. In contrast, the Carilon layer in the hose sample without the structural support failed terminating the test, cracking completely through the tube in a circumferential crack a short distance from the hose end. *Id.* Dr. Cassidy also determined that the crack morphology and location were very similar to the in-service Carilon cracks for the Brookshire hoses that he had examined previously in connection with the failed Brookshire hoses. *Id.* In addition, other signs of mechanical stress on the unsupported Carilon tube sample (additional cracks and stress whitening) were apparent throughout the length of the sample. *Id.*

Dr. Cassidy determined that his cyclic pressure test demonstrated two very important facts related to the failure of the TCI hoses at Brookshire's stations: (1) the structural support layer is critical to the performance of the hose, and operating conditions that allow the ester-based polyurethane layers to hydrolyze grossly compromise the long term performance of the hose, and (2) the Carilon layer is fully capable of functioning as the chemical barrier layer, even in a 9-year-old hose, as long as it still has the structural support of the polyester fibers fully connected to the ester-based polyurethane matrix. *Id.* at ¶ 9.

It is important to recognize that the cyclic fatigue test was an accelerated test in which Dr. Cassidy purposefully chose test conditions that were reasonable, but under which he was more likely to see a measurable result within a few days—as opposed to years of service life of the primary hoses at Brookshire's stations. *Id.* at ¶ 10. This is a well-accepted test design in the scientific community. *Id.* Dayco did very similar accelerated cyclic fatigue testing as part of the

development and qualification of this TCI primary hose, and the test conditions were modeled to some extent on the conditions utilized by Dayco in similar experiments. *Id.* Moreover, as stated above, the key experiment measurement was not the specific pressure or number of cycles it took to burst a particular hose sample—but rather the comparison of performance between the unsupported and supported samples under identical (and reasonable) process conditions.

Dr. Cassidy designed the cyclic fatigue test with a 50 psig upper boundary for the pressure cycles because this was within of the design operating pressure of the TCI primary hose, but at the upper end of that range. *Id.* at ¶ 11. Because this pressure is within the expected operating pressure of the hose, it is within the boundaries of the expected stresses that this product was designed to accommodate, and was a suitable maximum pressure to conduct accelerated testing of the performance of the product. *Id.* It is also important to note that at Brookshire's gasoline stations the hoses were pressure tested upon installation to 80 psi and then a more extended pressure test at 60 psig (well above the cyclic pressure test conditions). *Id.*

Dr. Cassidy designed the cyclic fatigue test such that the hose ends for each sample were free to move because (i) this permitted the measurement of elongation and an assessment of the strain on the hose under pressure, and (ii) cyclic fatigue testing methodologies published by ASTM do not fix the hose ends during testing. *Id.* at ¶ 12. It is also well-documented in the case evidence that, even though the hose ends are fixed, the 30 to 40 foot hose sections all elongate in service because they have substantial freedom to move in between the two fixed piping points. *Id.* Specifically, Fred Boley, the primary mechanic for Pump Masters who has worked at the Brookshire stations, testified in his deposition that all of the hoses grow in length "anywhere probably from 4 to 9 inches." *See id.* citing Boley Depo. excerpts attached as Exhibit 2 at pages 259-262. Indeed, the physical evidence shows that axial elongation of the hoses has led to severe

bends and even kinks in the hose at Brookshire stations. Paul Declaration at ¶ 5, attached as Exhibit E.

Thus, Dr. Manning's assumption in his Finite Element Analysis of a dimensionally fixed system in the axial direction is obviously incorrect. Paul Declaration at ¶ 1 & 4. As Dr. Paul explains in his attached declaration, the key inquiry for both Dr. Cassidy's and Dr. Broutman's work is to understand the localized stress and strain across one (or at most a few) corrugation profiles when the hose is pressurized. *Id.* at ¶ 2 & 3. This is because, if the hose is going to fail (assuming no unique manufacturing defects), it is likely to fail in the area of the corrugation experiencing the highest stress and strain. *Id.* Thus, one would like to know where that point is on the corrugation profile and how high the stress and strain are at that point. *Id.* Dr. Manning assumes in his FEA work that the each corrugation profile cannot move in the axial direction. That is clearly not correct because all the physical evidence in the case confirms that the hoses elongate, which can only happen if the hose is free to move in the axial direction. *Id.* Dr. Paul has completed a detailed engineering analysis of the dimensions of the gasoline secondary containment systems, the Tetra Tech field observations, and Dr. Cassidy's elongation (strain) measurements, and concluded that the level of axial expansion measured by Dr. Cassidy in his testing could be accommodated in the Brookshire system. *Id.* at ¶ 5. Thus, the unrestrained ends utilized by Dr. Cassidy are much more representative of actual operating conditions as compared to the restrictions on axial movement assumed as part of Dr. Manning's analysis. Finally, the standard test method for cyclic fatigue testing of pipe and hose published by ASTM directs the scientist to conduct the test with unrestrained ends. Cassidy Declaration at ¶ 6 (citing ASTM test method D2143-00). Dr. Manning provides no reasonable scientific justification for disregarding the accepted relevant test method.

In summary, it is the general practice within the scientific community (as evidenced by the ASTM standard) to conduct these types of cyclic fatigue tests with unrestrained ends and this experimental condition more closely approximates the actual operating environment of the Brookshire hoses. These test results are therefore not properly excludable under the standard articulated by the Supreme Court. In fact, Dr. Cassidy's test conditions lead to much more representative and meaningful information regarding the hose system's susceptibility to failure based on cyclic pressure fatigue as compared to Dr. Manning's FEA work.

Finally, Plaintiffs' complaint that the samples used for Dr. Cassidy's test *might not be* representative of the Brookshire hoses (Plaintiffs' motion at 10) is unsupported argument contrary to all the evidence. Dr. Cassidy testified during his deposition that the samples were the same hose construction and type as the Brookshire hoses. *See* Cassidy Depo. at pp. 128-29, and 223-25, attached as Exhibit F. Dr. Cassidy confirmed that conclusion was based on examination of hundreds of hoses. *Id.* Moreover, the service life in a gasoline station (9 years) was almost identical to the Brookshire stores. *Id.* Plaintiffs submit no evidence to the contrary.

C. **Dr. Broutman's Finite Element Analysis Scientifically Models the Key Stress and Strain Analyses Relevant to Mechanical Failure of the Hose.**

Plaintiffs' complaints about the substance of Dr. Broutman's FEA work are similar to those lodged against Dr. Cassidy's cyclic fatigue study (i.e., 50 psig was used instead of 35 psig) and the termination points for the corrugation profiles were allowed to move axially. All of the analysis above will not be repeated here because the issues are largely the same.

Nevertheless, as Dr. Broutman testified at his deposition, the use of 50 psig was chosen because that was the pressure used by Dr. Cassidy, and Dr. Broutman was trying to mathematically confirm and correlate the resultant stresses and strains to the physical conditions observed in Dr. Cassidy's test. Broutman Depo. at pp. 31-35, excerpts attached as Exhibit G.

Thus, Dr. Broutman sought in part to confirm that the computer model matched the experimental physical observations. As Dr. Broutman testified, the computer results can be "scaled" to determine actual stresses and strains at different pressures. *Id.* Dr. Paul performed similar calculations associated with both the pressure and bending-induced stresses on the unsupported hose, and explained this "scaling" process in some detail in his deposition. Paul Depo. at pp. 202-211 (explaining scaling of stress calculations in some detail), excerpts attached as Exhibit H. Thus, one can use the physical observations combined with the various mathematical models to "scale" the results to particular operating conditions if that is desired. The net result is that the stresses and strains on the Carilon liner in the absence of the structural support system – based on any reasonable operating assumptions -- are outside of acceptable engineering design criteria. Paul Depo. at pp. 210-11. Accordingly, one could not reasonably expect the Carilon liner to survive such an environment over the long term. *Id.*

Plaintiffs spend a large portion of their motion criticizing Dr. Broutman for not investigating more of the Brookshire hoses in Pump Masters' Shreveport yard to make determinations regarding the condition of the structural support system. *See* Plaintiffs' Motion at 5-7. Dr. Broutman did inspect at least 6 Brookshire hose sections, including 3 complete hoses that Shell was permitted to have for destructive testing. Broutman Depo. at 39-40. Moreover, he evaluated the original design of the hose in some detail as part of setting up his FEA work. *Id.* at 19-22. This is clearly a sufficient basis to support the hose design parameters incorporated by Dr. Broutman into his FEA work. Nevertheless, Dr. Broutman was not asked to, nor did he, render an opinion regarding the general condition of the structural support system of the TCI hose removed from Brookshire's gasoline stations. Instead, this work and these opinions were

rendered by Dr. Cassidy and Dr. Paul, both of whom testified about this topic at their depositions (a fact that Plaintiffs conveniently ignore in their motion).

Plaintiffs' hyperbole notwithstanding, the fact remains that only Shell has conducted any tests on the condition of the structural support system. Paul Declaration, at ¶ 7 & 8. Plaintiffs' experts have actively disavowed any interest in this topic. As Dr. Paul indicates in the attached declaration, wherever we had a meaningful opportunity to observe the condition of the structural support system in the vicinity of a hose failure, the ester-based polyurethane was badly degraded to non-existent. *Id.* Plaintiffs have not cited any contrary reliable evidence. Certainly, Dr. Broutman relied on Dr. Cassidy's and Dr. Paul's conclusions regarding the loss of structural support in setting up his FEA comparison, but those opinions rest on work by Dr. Paul and Dr. Cassidy. Those opinions by Dr. Paul and Dr. Cassidy were disclosed in their report and subject to cross examination. It is both misleading and unfair to criticize Dr. Broutman for an opinion that he does not have (and was not asked to render), particularly where that opinion is more than adequately supported by the work of Shell's other experts.

Finally, it is important to note that Shell first received Dr. Manning's "rebuttal" FEA analysis on January 22, 2007—almost 5 months after the close of discovery and the completion of expert depositions. It was a substantial surprise to Shell to receive this additional substantive expert test work buried as an exhibit to a *Daubert* motion with no other notice or disclosure. Shell has requested from Plaintiffs, but still not received, the back-up input and computer output information for this FEA work. In addition, Dr. Broutman has been in Mexico and Africa for the past month, and generally has not been available to work on this matter. Shell accordingly reserves the right to supplement Dr. Broutman's prior FEA analysis in response to Dr.

Manning's FEA work and seek any other appropriate relief in connection with this extremely late expert report.

WHEREFORE, PREMISES CONSIDERED, Shell requests that this Court deny Plaintiffs' Motion in Limine Concerning Dr. Broutman and Testing Report and Analysis of Dr. Patrick Cassidy and Dr. Donald Paul, permit Drs. Broutman, Cassidy and Paul to testify as to all expert opinions developed in their expert reports and deposition testimony, and that the Court grant Shell such other and further relief to which it may show itself justly entitled.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that the foregoing Response in Opposition to Plaintiffs' Motion to Exclude Certain Opinions of Drs. Broutman, Cassidy and Paul was served on all counsel of record via electronic mail on this the 1st day of March, 2007.